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10/589,741

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Michael J. Sailor

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GREER, BURNS & CRAIN  
300 S WACKER DR  
25TH FLOOR  
CHICAGO, IL 60606

EXAMINER

ANDLER, MICHAEL S

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/589,741	<b>Applicant(s)</b> SAILOR ET AL.	
	<b>Examiner</b> Michael Andler	<b>Art Unit</b> 2876	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 December 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____.                                     |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>18 December 2006</u> .  | 6) <input type="checkbox"/> Other: _____.                         |

### **DETAILED ACTION**

1. The examiner acknowledges and has entered the preliminary amendment filed on 16 August 2006.

#### ***Claim Objections***

2. Claim **8** is objected to for the following informality:

Regarding claim **8**, there is no antecedent basis for the elements of “said first porous layer” and “said n additional porous layers”. The examiner respectfully suggests that the applicant delete “said first porous layer and said n additional porous layers” and substitute it with --said layer of material--.

#### ***Double Patenting***

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No.10/503,217). Although the conflicting claims are not identical, they are not patentably distinct from each other because recite terminology that refers to the same disclosed material.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Regarding claim 1, the instant application recites "a layer of material; and porosity within the layer of material" as described on page 4, lines 11-12 of the specification as "a porous thin film 12 having varying porosity is shown in Figure 1 as being formed on a substrate 14". Claim 1 of the conflicting application recites "a first porous layer having a first porosity; and n additional porous layers at least one of which has a porosity differing from said first porosity" which also describes a layer of material having porosity. Therefore, it would have been obvious to one of ordinary skill in the art to describe a multi-layer thin film having varying porosity and formed on a substrate in either manner.

Further regarding claim 1, the instant application recites "an optical signature including a detectable grey scale code" while claim 1 of the conflicting application recites "an optical signature having a particular predetermined code" where the Abstracts of each application separately describe "a particle having a code embedded in its physical structure by refractive index changes between different regions of the particle". Therefore, it would have been obvious to one of ordinary skill in the art to

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describe the embedded code as a gray scale code since it would be formed in the structure in the same disclosed manner.

Claims **2, 4, 6, 7, 8 and 9** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims **2, 4, 7, 8, 9 and 10** respectively, of copending Application No.10/503,217). Although the conflicting claims are not identical, they are not patentably distinct from each other because recite terminology in the independent claim that refers to the same disclosed material, as described above with regards to claim **1**.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim **36** is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim **38** of copending Application No.10/503,217). Although the conflicting claims are not identical, they are not patentably distinct from each other because recite terminology that refers to the same disclosed material.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Regarding claim **36**, the instant application recites "an encoded micron-sized particle having a grey scale code embedded in its physical structure by refractive index changes between different regions of the particle" while claim **38** of the conflicting application recites "an encoded micron-sized particle having a particular predetermined code embedded in its physical structure by refractive index changes between different

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regions of the particle". The Abstracts of each application separately describe "a particle having a code embedded in its physical structure by refractive index changes between different regions of the particle". Therefore, it would have been obvious to one of ordinary skill in the art to describe the embedded code as a gray scale code since it would be formed in the structure in the same disclosed manner.

Claims **37, 38, 39, 40 and 41** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims **41, 42, 43, 44 and 45** respectively, of copending Application No.10/503,217). Although the conflicting claims are not identical, they are not patentably distinct from each other because recite terminology in the independent claim that refers to the same disclosed material, as described above with regards to claim **36**.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

a) Claims **1-41** are rejected under 35 U.S.C. 102(a) as being anticipated by Sailor et al. (WO03067231).

Regarding claims **1 and 36**, Sailor et al. discloses an optically encoded particle, comprising:

a layer of material (Fig 1); and  
porosity within the layer of material configured to produce an interference pattern in the reflectivity spectrum that forms an optical signature including a detectable grey scale code (Page 5, lines 3-5 and 19-23); wherein the grey scale code is embedded in its physical structure by refractive index changes between different regions of the particle (See Abstract).

Regarding claims **2 and 17**, Sailor et al. discloses wherein the particle has a diameter of hundreds of microns or less (Page 4, lines 11-13).

Regarding claims **3 and 10**, Sailor et al. wherein said porosity is formed in accordance with an etching waveform (Fig 3A), and there is a correspondence between sine components of the etching waveform and a spectral position and height of peaks (Page 4, lines 6-8) in Fourier transformed k-space of said interference pattern (See Fig 4, step 20; Fig 2A; Fig 2B and page 8, lines 10-19).

Regarding claim **4**, Sailor et al. discloses wherein said interference pattern in the reflectivity spectrum extends beyond the visible spectrum (Page 10, lines 1-3).

Regarding claim **5**, Sailor et al. discloses wherein the height of the spectral peaks correspond to sine components' amplitudes (Page 4, lines 6-8).

Regarding claim **6**, Sailor et al. discloses wherein said material comprises a semiconductor (Page 6, lines 3-5).

Regarding claims **7 and 16**, Sailor et al. discloses wherein said semiconductor comprises porous silicon (Page 6, lines 3-5).

Regarding claim **8**, Sailor et al. discloses wherein said first porous layer and said n additional porous layers are formed from an insulator (Page 6, lines 3-5).

Regarding claims **9, 11 and 37**, Sailor et al. discloses a receptor for binding a predetermined analyte (Page 6, lines 20-22).

Regarding claims **12 and 38**, Sailor et al. discloses wherein said receptor is a receptor for a biological analyte (See claim 15).

Regarding claims **13 and 39**, Sailor et al. discloses wherein said receptor is a receptor for a chemical analyte (See claim 16).

Regarding claims **14 and 40**, Sailor et al. discloses wherein said receptor is a receptor for a gaseous analyte (See claim 17).

Regarding claims **15 and 41**, Sailor et al. discloses a fluorescence tag for assaying the particle (Page 12, lines 6-7).

Regarding claim **18**, Sailor et al. discloses a method for encoding thin films, comprising steps of:

etching a semiconductor or insulator substrate to form a thin film including pores (Fig 4, steps 14, 16 and 18);

varying etching conditions to vary porosity in the thin film according to a pattern that will generate an optical signature in the reflectivity spectrum in response to illumination, the optical signature including a grey scale code (Fig 4, step 20).

Regarding claim **19**, wherein said step of varying comprises applying an etching waveform formed by the addition of at least two separate sine components in accordance with  $Y_{comp} = [Y_1 + \dots + y_n]/n$ , where  $Y_n$  are the sine components (See



Fig 3A and page 4, lines 6-8; and Fig 4, step 20; Fig 2A; Fig 2B and page 8, lines 10-19).

Regarding claim **20**, Sailor et al. discloses wherein the grey scale code is revealed in naturally optically converted k-space (See Fig 2A and 2B).

Regarding claim **21**, Sailor et al. discloses further comprising a step of separating the thin film from the semiconductor or insulator substrate (Fig 4, step 22).

Regarding claim **22**, Sailor et al. discloses further comprising a step of separating the thin film into particles (Fig 4, step 24).

Regarding claim **23**, Sailor et al. discloses further comprising a step of placing a particle within a host (Fig 4, step 28).

Regarding claim **24**, Sailor et al. discloses further comprising steps of: generating an interference pattern in the reflectivity spectrum by illumination of one or more of the particles (See claim 32);

determining a particle's code from the position and heights of peaks in k-space (See Fig 2A and 2B and claim 32).

Regarding claim **25**, Sailor et al. discloses wherein said step of varying etching conditions varies the etching conditions according to sine component equations (See Page 4, lines 6-8 and Fig 4, step 20; Fig 2A; Fig 2B and page 8, lines 10-19).

Regarding claim **26**, Sailor et al. discloses further comprising a step of spatially defining the semiconductor or insulator substrate to conduct said step of etching in a spatially defined location or locations (See claim 27).

Regarding claim **27**, Sailor et al. discloses wherein said step of varying further varies etching conditions in different spatially defined locations to encode multiple codes in the thin film (See claim 28).

Regarding claim **28**, Sailor et al. discloses further comprising a step of separating the thin film from the semiconductor or insulator substrate (See claim 29).

Regarding claim **29**, Sailor et al. discloses further comprising a step of separating the thin film into particles (See claim 30).

Regarding claim **30**, Sailor et al. discloses a method for identification of an analyte bound to an encoded particle or identification of a host including an encoded particle of claim **10**, the method comprising steps of

associating the encoded particle with the analyte or the host;

generating an interference pattern in the reflectivity spectrum by illumination of the particle;

determining the particle's code from the interference pattern;

identifying the analyte or the host based upon said step of determining (See claim 32).

Regarding claim **31**, Sailor et al. discloses further comprising a step of designating the particle to bind an analyte by modifying the particle with a specific receptor or targeting moiety (See claim 33).

Regarding claim **32**, Sailor et al. discloses wherein the targeting moiety is a sugar or polypeptide (See claim 34).

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Regarding claim **33**, Sailor et al. discloses further comprising a step of signaling binding of an analyte by fluorescence labeling or analyte autofluorescence (See claim 35).

Regarding claim **34**, Sailor et al. discloses a method of encoding micron sized particles, the method comprising steps of:

etching a wafer to form a thin film having a varying porosity that will produce a detectable optical signature grey scale code in response to illumination;

applying an electropolishing current to the wafer to remove the porous film from the wafer;

dicing the film into micron-sized particles, each micron-sized particle maintaining an optical signature produced by said step of etching (See claim 36).

Regarding claim **35**, Sailor et al. discloses further comprising a step of modifying the particles with a specific receptor or targeting moiety (See claim 37).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Andler whose telephone number is (571) 270-5385 and whose e-mail address is michael.andler@uspto.gov. The examiner can normally be reached on Monday-Friday 7:30 AM to 3:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lee can be reached on (571) 272-2398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael Andler/  
Examiner, Art Unit 2876

/Michael G Lee/  
Supervisory Patent Examiner, Art Unit 2876